

Achieving The New 2012 Energy Code



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Achieving the 2012 Energy Code

Speakers:

Ryan Meres

Code Compliance Specialist

Institute for Market Transformation

ryan@imt.org

Roger Chang, PE, LEED AP

Principal, Director of Sustainability

Westlake, Reed, Leskosky

rchang@wrltdesign.com

Patrick A. Kunze, PE, LEED AP

Mechanical Section Head, Senior Principal

GHT Limited

PKUNZE@ghtltd.com

Moderator:

Keith P. Nelson, Architect

Senior Associate

Wiss, Janney, Elstner Associates, Inc.

knelson@wje.com



Overview

- ❖ Introduction
- ❖ Scope of Energy Codes
- ❖ Commercial Codes
- ❖ Residential Codes
- ❖ Questions?



Development Next Steps

- ✓ Second Public comment period ended June
- ✓ Green TAG and Construction Codes Coordinating Board meeting to go over and make changes if necessary
- ✓ Codes have been finalized by the CCCB
- ✓ Once codes have been officially submitted to Council, they have 45 legislative days to vote on adoption



Energy and Green Code Scope

- ✓ The DC Energy Code applies to all projects
- ✓ The DC Green Code covers:
 - ✓ All commercial projects (10,000 SF and larger)
 - ✓ Multi-family residential 4 stories and larger (and 10,000 SF and larger)



Green Code Compliance Paths

- ✓ Green Building Act
- ✓ Green Construction Code (IgCC as amended))
- ✓ Alternate Compliance Pathways
 - ✓ ASHRAE 189.1
 - ✓ LEED
 - ✓ Enterprise Green Communities
 - ✓ ICC-700, NGBS



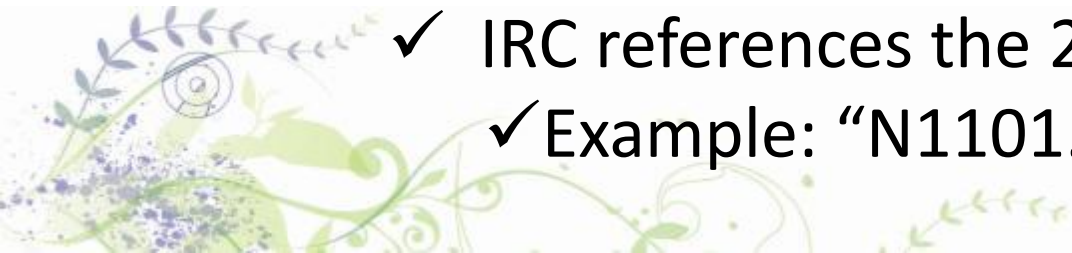
Transitory Provisions for the 2013 Codes

- ✓ Exceptions (Section 123 Building Code)
 - ✓ Projects with existing valid building permits
 - ✓ Projects with existing filed application
 - ✓ Projects with existing design contracts
 - ✓ Tenant Layout Permits for built Core and Shell



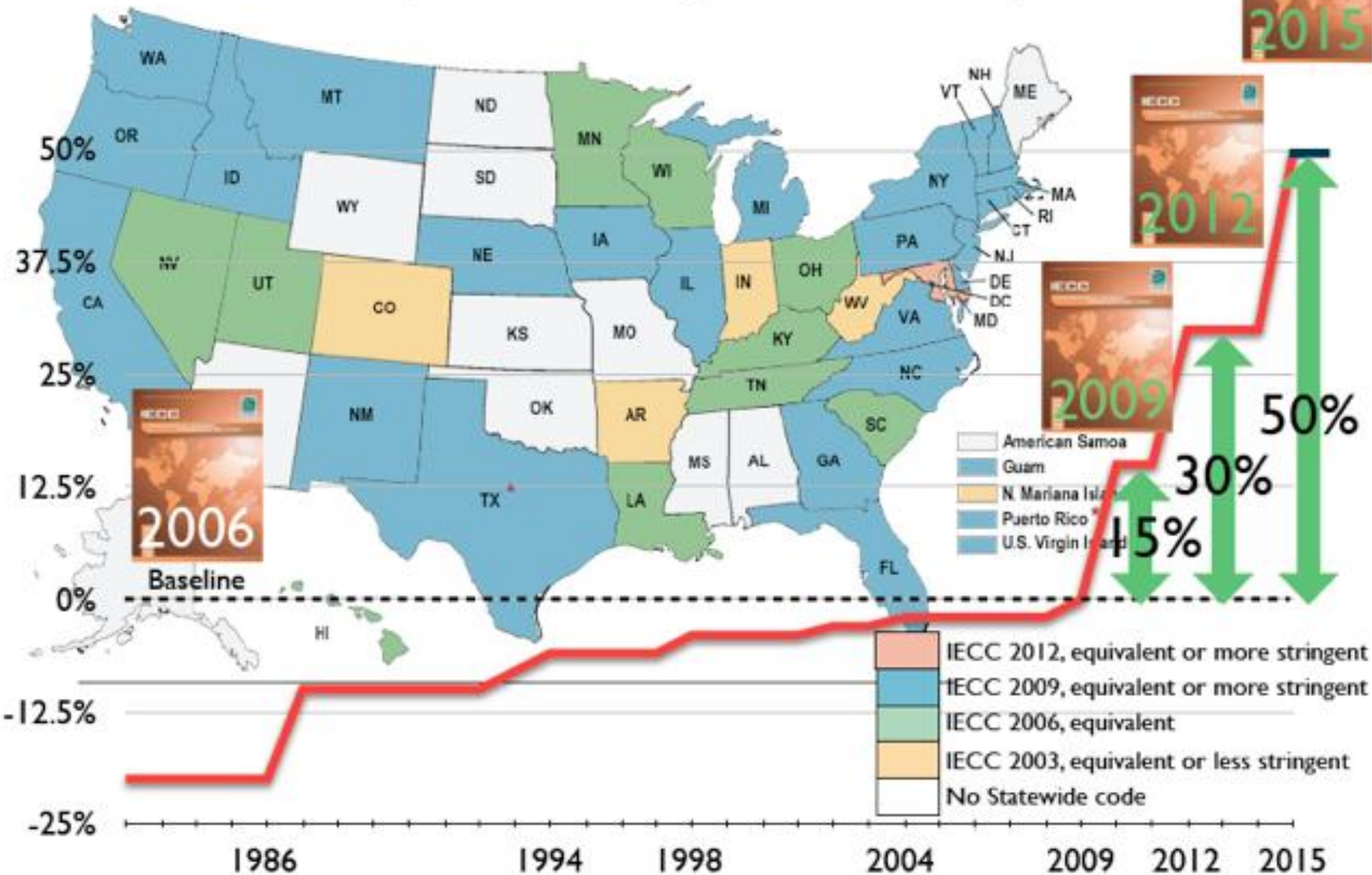
Overview of the Energy Code

- ✓ Designed to save 30% more energy
 - ✓ Increased requirements for air sealing, insulation levels, and building systems
- ✓ Code has two separate divisions
 - ✓ Commercial Buildings (ex. C101.1)
 - ✓ All non-“Residential Buildings”
 - ✓ Residential Buildings (ex. R101.1)
 - ✓ Detached one- and two- family dwellings
 - ✓ Group R2, R3, R4 < 4 stories in height
 - ✓ IRC references the 2012 IECC
 - ✓ Example: “N1101.2 (R101.3)”

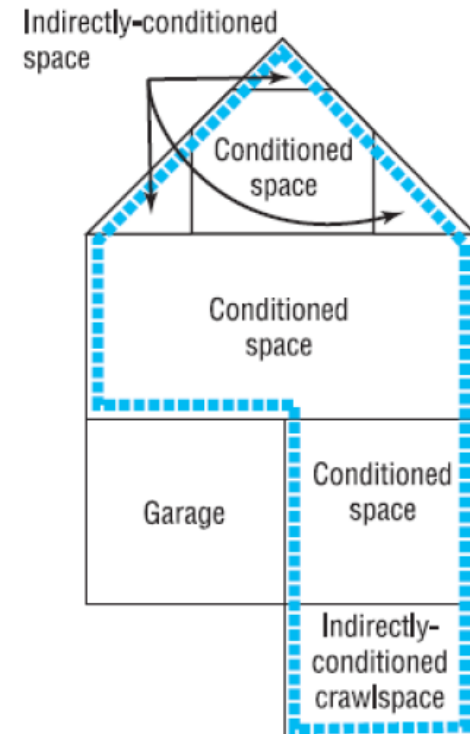
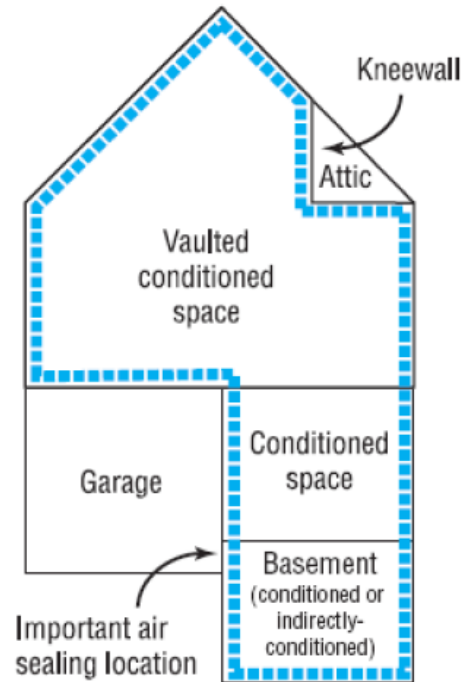
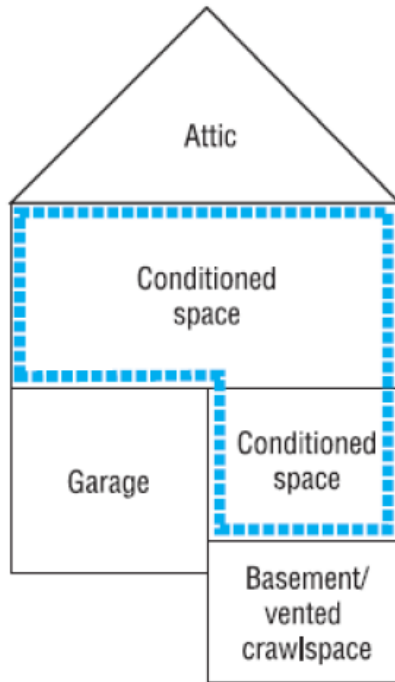


Residential Energy Codes Improving FASTER...

Relative to 2006 IECC (International Energy Conservation Code) Baseline



Thermal Enclosure Requirements (402)



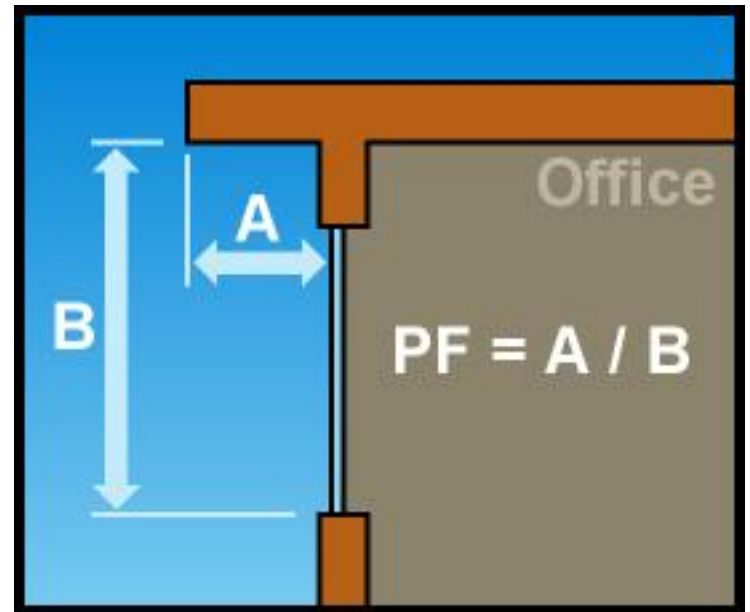
Building Envelope Requirements (C402)

Table 1: Changes in insulation and U-factors for prescriptive (Table R402.1.1) path in the 2012 IECC

[illegible]

Building Envelope Requirements (C402)

- ✓ Windows (SHGC, U-Value)
 - ✓ Projection Factor (SHGC)
 - ✓ Increased vertical fenestration (40%) and skylight (5%) with use of daylighting controls



Building Envelope Requirements (C402)

- ✓ Commercial Air leakage
 - ✓ Air barrier and thermal barrier shall be aligned and continuous
 - ✓ Joints and seams should be sealed
 - ✓ Recessed lighting fixtures (IC)
 - ✓ Opaque exterior materials Req's (choose one)
 - ✓ Materials
 - ✓ Assemblies
 - ✓ Whole Building Leakage Test



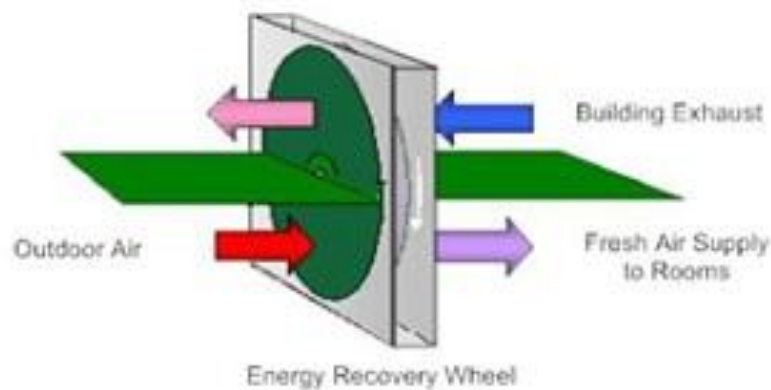
Building Mechanical Systems (403)

- ✓ Simple Systems – Single-Zone
- ✓ Complex Systems – Multi-Zone
- ✓ Minimum Efficiency Requirements
- ✓ Demand Control / Energy Recovery
- ✓ Other Coverage Topics
 - ✓ Duct/Pipe Insulation
 - ✓ Economizer
 - ✓ Fan Energy



Energy Recovery

- ✓ Significant Changes
- ✓ Before: 70% OA and 5,000 cfm
- ✓ Current: As low as 30% OA



The energy recovery wheel transfers heat and humidity between the exhaust air and the supply air.



Efficiency Comparison

	ASHRAE 90.1-2010	ASHRAE 90.1-2007	ASHRAE 90.1-2004
Fan, Constant Volume	0.0011 HP/cfm	0.0011	0.0011
Fan, VAV	0.0015 HP/cfm	0.0015	0.0015
AC, Air Cooled, ≥ 760 MBH	9.5 EER	9.5 EER	9.0 EER
Air-Cooled Chiller, <150 Tons	9.562 EER	9.562 EER	9.562 EER
Water-Cooled Centrifugal, <150 tons	0.634 kw/ton	0.7 kw/ton	0.7 kw/ton
Boilers, Gas-Fired, <300 MBH	80% AFUE	80% AFUE	80% AFUE
Duct Insulation, Combined Cooling/Heating, Exterior	R-6	R-6	R-6
Pipe Insulation, 141-200F, 1.5 to 4"	2	1	1
SHW, Gas Storage, >75 MBH	80% Et	80% Et	80% Et

Most of the increases in stringency are related to lighting, controls and building envelope.



Service Water Heating (404)

- ✓ Coverage
 - ✓ Restrooms, showers, laundries, kitchens, pools and spas, defrosting of sidewalks and driveways, car washes, beauty salons, and other commercial enterprises.
- ✓ Minimum efficiency for equipment – no significant changes from previous edition.
- ✓ Fixture efficiency covered in Green/Plumbing Code



Lighting Systems (405)

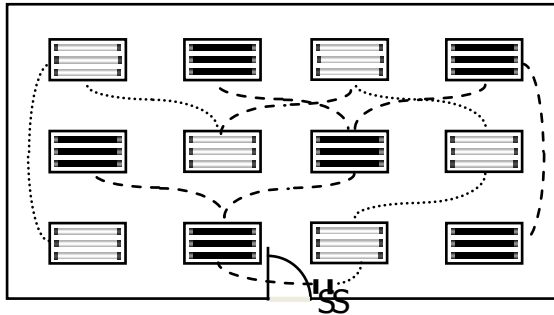
- ✓ 40% of Commercial Building Energy Consumption
- ✓ Impact on HVAC Load
- ✓ Lighting Power Density
 - ✓ Reductions across the board
- ✓ Controls
 - ✓ Additional emphasis – daylit spaces

	ASHRAE 90.1-2010	ASHRAE 90.1-2007	ASHRAE 90.1-2004
Lighting, Office	0.9	1	1
Lighting, Multifamily	0.6	0.7	0.7

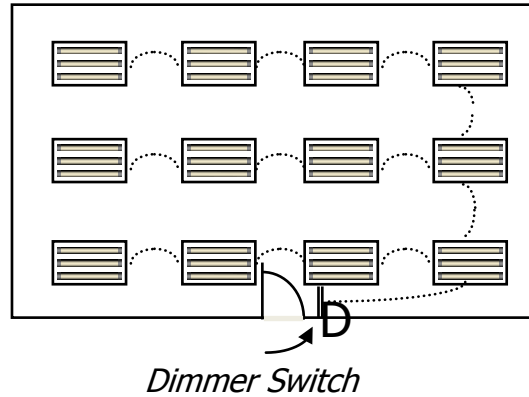


Lighting Systems (405)

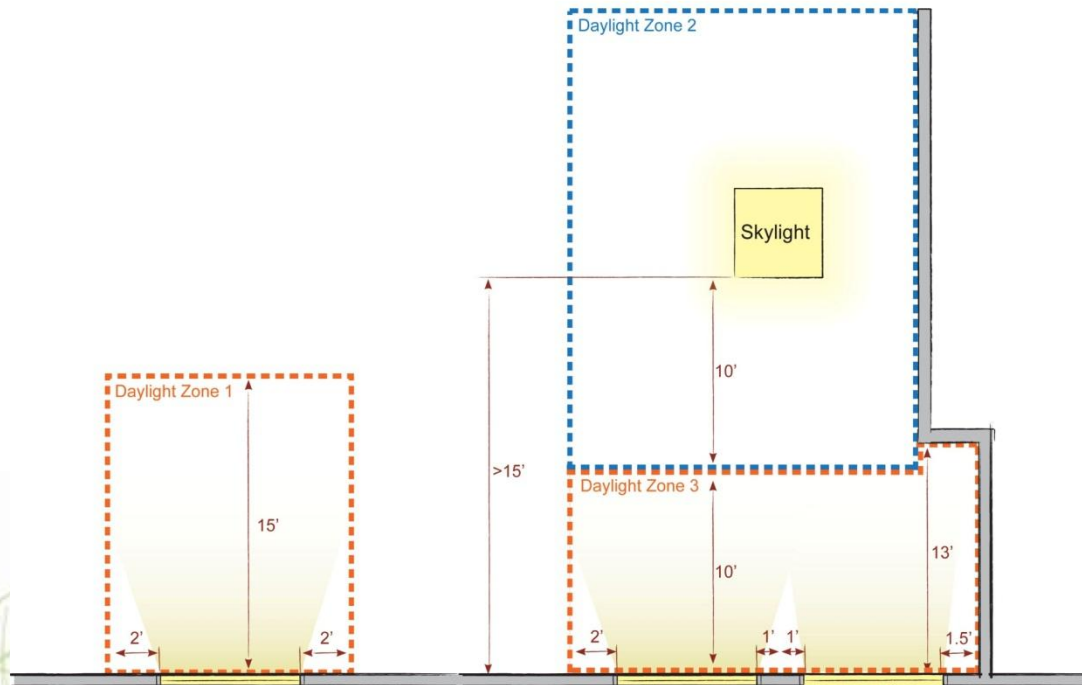
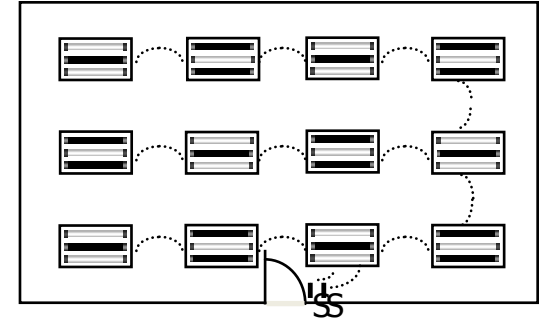
Alternating Luminaires



Dimming



Alternating Lamps



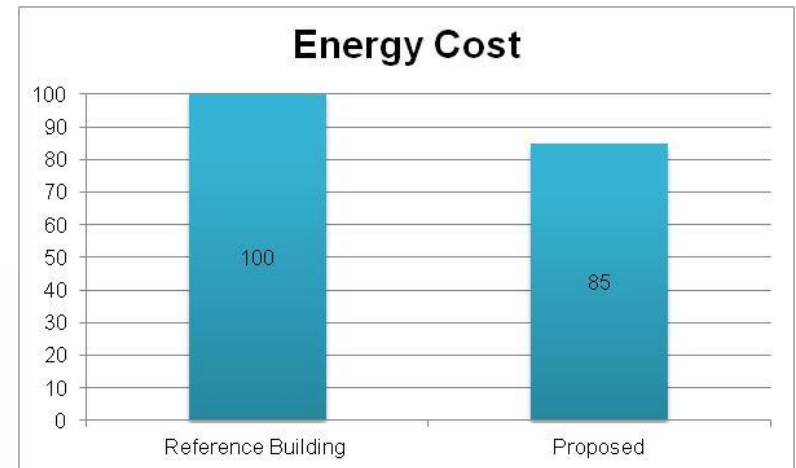
Additional Efficiency (406)

- ✓ 1 – Additional HVAC Equipment Efficiency
- ✓ 2 – Additional Lighting Power Density Reductions
- ✓ 3 – On-Site Renewable Energy
 - ✓ 0.5 W/sf (conditioned)
 - ✓ 3% of mechanical, SHW, lighting



Total Building Performance (407)

- ✓ Greatest design flexibility
- ✓ Requires whole-building energy analysis
- ✓ Similar language to 90.1-2010 energy cost budget
- ✓ ComCheck is not an energy modeling tool
- ✓ Proposed versus Standard Reference Building
 - ✓ 85%!

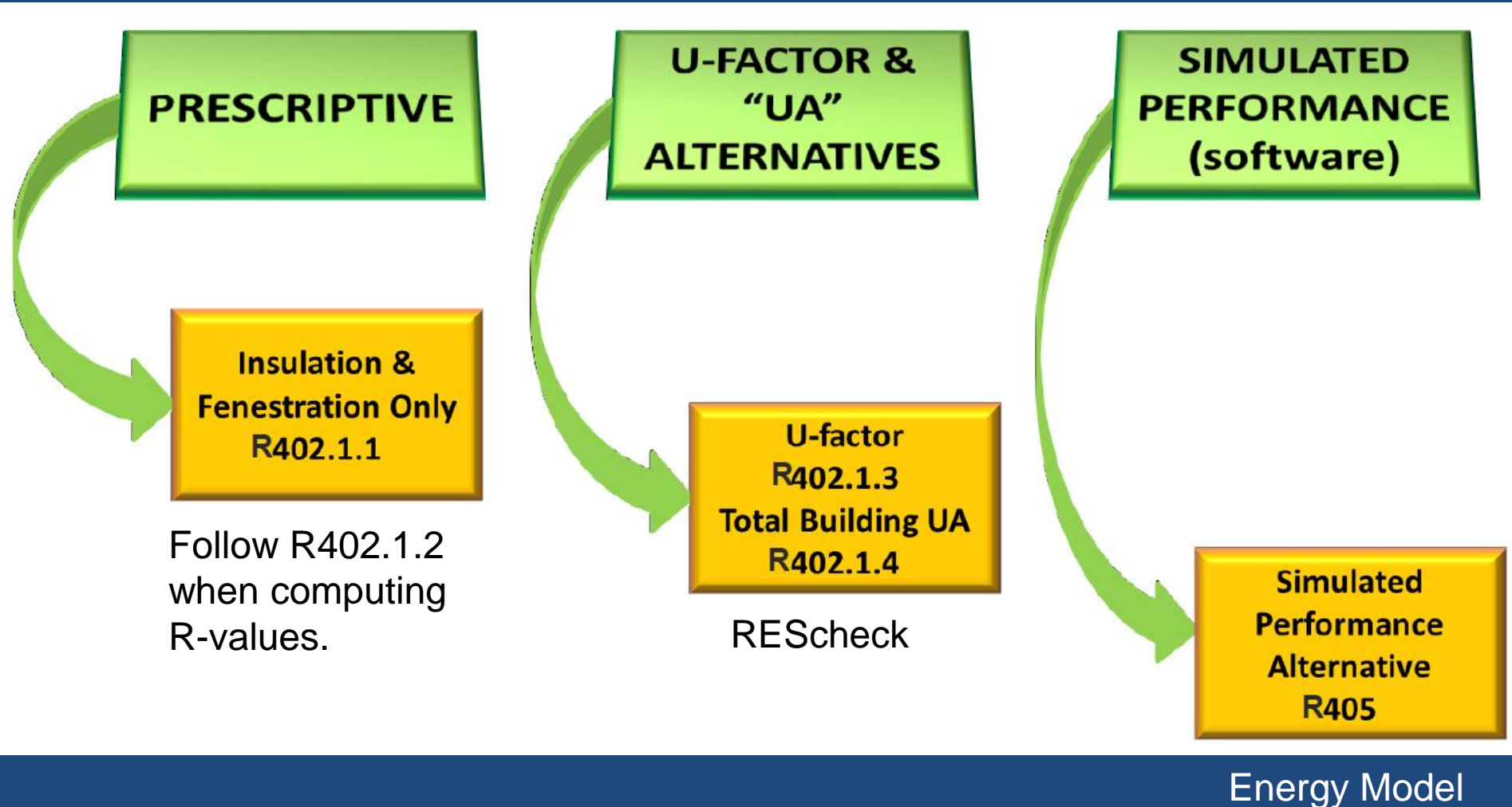


DC's Residential Energy Code

Ryan Meres
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Compliance– Three Options



Current D.C. Code vs. 2012 IECC (w/DC Amendments)

Significant changes for Low-Rise Residential
(one- and two-family, multi-family 3 stories or less)

Table 402.1.1 Insulation and Fenestration Requirements:

Component	Current D.C. Code	2012 IECC
Skylights	U-0.60	U-0.55
Glazed Fenestration	SHGC-N/R	SHGC-0.40
Wood frame wall	R-18	R-20 or R-13+5
Mass wall	R-5/10	R-8/13

No changes to requirements for: ceiling, floor, slab or window U-factor.

Current D.C. Code vs. 2012 IECC (w/DC Amendments)

Additional Changes:

Section/Component	Current D.C. Code	2012 IECC
402.4 Air Leakage (envelope)	7 ACH ₅₀ + visual inspection option	5 ACH ₅₀ , no visual inspection option
403.2 Ducts	8 CFM/100ft ² floor area @ post construction 6 CFM @ rough-in	8 CFM/100 ft ² floor area total leakage @ post const. or rough-in*
403.4 Hot water piping insul.	R-2	R-3
403.5 Mechanical ventilation	NR	Natural and mechanical per IRC and IMC
404 Lighting Systems	50% high efficacy	75% high efficacy

*Sampling allowed for multifamily

The evolution of residential energy codes...

HOW ENERGY CODES MAKE HOMES MORE EFFICIENT

Household energy use is lower than it was in the '80s, even as we buy up PlayStations and iPhones. Why? Thank stronger energy codes.

Building energy codes set minimum legal standards for the energy efficiency of new homes. That's good for the environment because it lowers carbon emissions, and also good for Americans' bank accounts. Houses built to stronger codes are up to 44% more efficient and can save a family hundreds of dollars a year on energy costs. The two hypothetical properties depicted below—a 1983 house and a 2012 house—show the evolution of an average home and a side-by-side comparison of how energy codes make a surprising difference in home energy efficiency.

